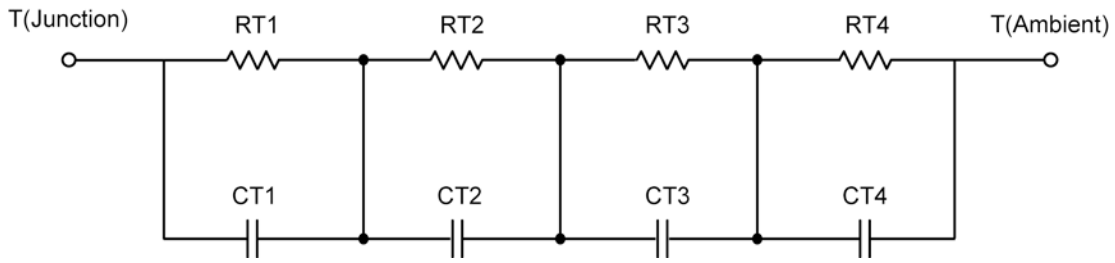
R-C Thermal Model Parameters

DESCRIPTION

The parametric values in the R-C thermal model have been derived using curve-fitting techniques. R-C values for the electrical circuit in the Foster/Tank and Cauer/Filter configurations are included. When implemented in P-Spice, these values have matching characteristic curves to the single-pulse transient thermal impedance curves for the MOSFET.

These RC values can be used in the P-SPICE simulation to evaluate the thermal behavior of the MOSFET junction temperature under a defined power profile. These techniques are described in Application Note AN609, "Thermal Simulation of Power MOSFETs on the P-Spice Platform."

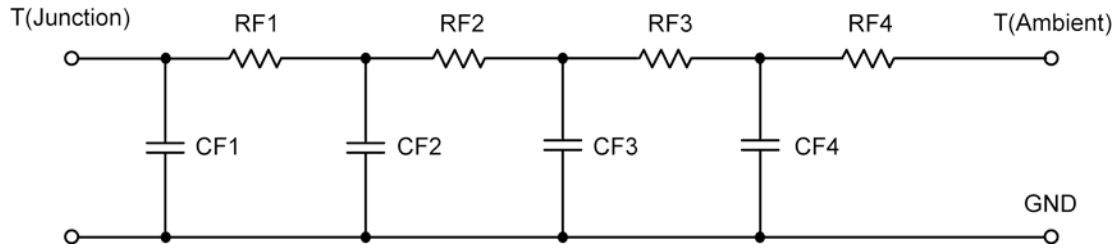
R-C THERMAL MODEL FOR TANK CONFIGURATION



R-C VALUES FOR TANK CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RT1	4.8867	N/A	2.5401
RT2	44.9106	N/A	7.1875
RT3	13.2696	N/A	11.0233
RT4	21.9331	N/A	7.2491
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CT1	1.7548 m	N/A	617.1702 u
CT2	1.4462	N/A	69.6245 m
CT3	25.5175 m	N/A	102.9985 m
CT4	100.9694 m	N/A	8.3697 m

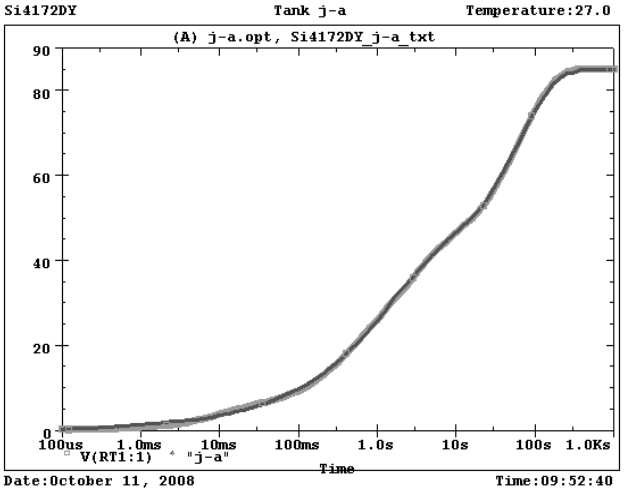
This document is intended as a SPICE modeling guideline and does not constitute a commercial product data sheet. Designers should refer to the appropriate data sheet of the same number for guaranteed specification limits.

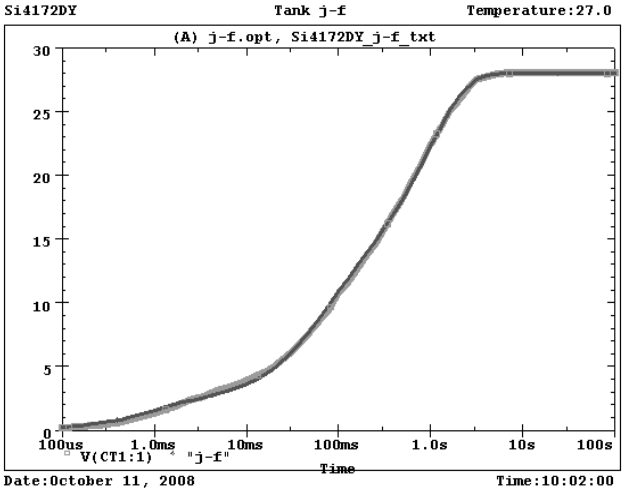
R-C THERMAL MODEL FOR FILTER CONFIGURATION



R-C VALUES FOR FILTER CONFIGURATION			
Thermal Resistance (°C/W)			
Junction to	**Ambient**	**Case**	**Foot**
RF1	5.6897	N/A	2.8317
RF2	21.2184	N/A	8.7795
RF3	17.6002	N/A	7.8639
RF4	40.4917	N/A	8.5249
Thermal Capacitance (Joules/°C)			
Junction to	**Ambient**	**Case**	**Foot**
CF1	1.4536 m	N/A	416.9451 u
CF2	19.9921 m	N/A	6.0982 m
CF3	123.3450 m	N/A	27.8864 m
CF4	1.4725	N/A	60.3244 m

Note
NA indicates not applicable


Si4172DY
Tank j-a
Temperature:27.0
(A) j-a.opt, Si4172DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RT1:1)
"j-a"
Time
Date:October 11, 2008
Time:09:52:40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Tank j-f
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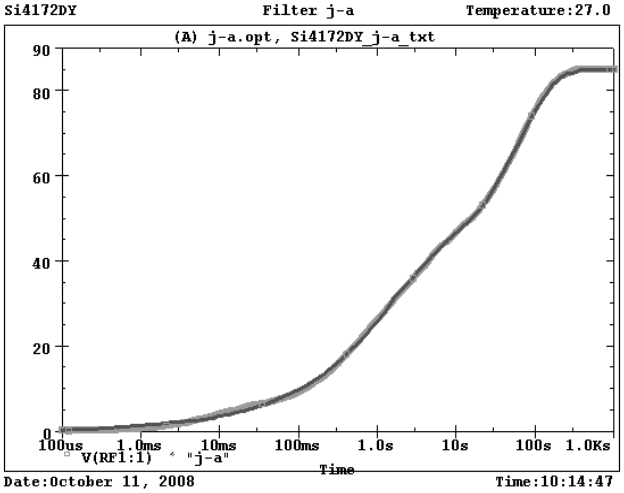
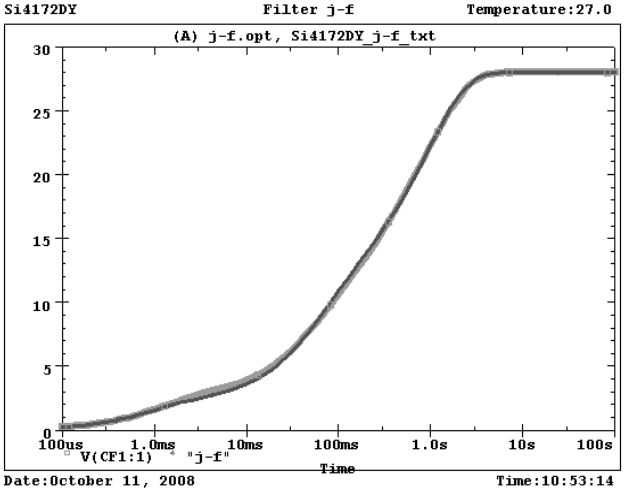
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CT1:1)
"j-f"
Time
Date:October 11, 2008
Time:10:02:00


Si4172DY
Filter j-a
Temperature:27.0
(A) j-a.opt, Si4172DY_j-a_txt
90
80
60
40
20
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
1.0Ks
V(RF1:1)
"j-a"
Time
Date:October 11, 2008
Time:10:14:47


Si4172DY
Filter j-f
Temperature:27.0
(A) j-f.opt, Si4172DY_j-f_txt
30
25
20
15
10
5
0
100us
1.0ms
10ms
100ms
1.0s
10s
100s
V(CF1:1)
"j-f"
Time
Date:October 11, 2008
Time:10:53:14